

## Chapter 296-818 WAC

### ABRASIVE BLASTING

#### NEW SECTION

**WAC 296-818-100 Scope.** This chapter applies to all abrasive blasting operations where an abrasive is forcibly applied to a surface using any of the following:

-  Pneumatic pressure
-  Hydraulic pressure
-  Centrifugal force

**References:** Depending on your work processes, here are examples of other chapters you may need:  
Safety and health core rules, chapter 296-800 WAC  
Machine safety, chapter 296-806 WAC  
Respiratory hazards, chapter 296-841 WAC  
Respirators, chapter 296-842 WAC  
Lead, chapter 296-857 WAC  
Scaffolds, chapter 296-874 WAC  
Cadmium, chapter 296-62 WAC  
Part L, Electrical, chapter 296-24 WAC

#### NEW SECTION

**WAC 296-818-200 General safety--Summary contents.**

**Your responsibility:**

To protect employees from hazards associated with their work environment

Dust hazards

WAC 296-818-20005

Personal protective equipment (PPE)

WAC 296-818-20010

Housekeeping

WAC 296-818-20015

NEW SECTION

**WAC 296-818-20005 Dust hazards.**

**IMPORTANT:**

✍ Abrasives and the surface coatings on materials blasted are shattered and pulverized during blasting operations. The dust formed will contain particles that could result in the following hazards:

- Respiratory
- Fire
- Explosion

✍ Wet blasting methods minimize dust exposure, but dispersed droplets, mists, and dried residues may become airborne and create potential exposures.

**You must:**

✍ Evaluate the potential health hazards from abrasive blasting operations by considering the composition and toxicity of the abrasive material and the surface being abraded.

**References:**

- ✍ For additional hazard assessment requirements, go to these separate chapters:
  - Respirators, chapter 296-842 WAC
  - The Safety and health core rules, chapter 296-800 WAC
  - Personal protective equipment, WAC 296-800-16005.
- ✍ For requirements on the use of Combustible organic abrasive, go to WAC 296-818-30005.

**You must:**

✍ Keep dust concentrations below the permissible exposure limits found in a separate chapter, Respiratory hazards, chapter 296-841 WAC.

- Note:** When sampling for dust concentrations, place the sample collection device:
- In the breathing zone of the operator;
- AND**
- Outside the respiratory protection worn.

NEW SECTION

**WAC 296-818-20010 Personal protective equipment (PPE).**

**You must:**

✍ Supply and make sure personal protective equipment is worn.

✍ Follow the requirements in Table-1, Personal Protective Equipment (PPE).

**Table-1: Personal Protective Equipment (PPE)**

PROVIDE	WHEN
<p><b>Abrasive Blasting Respirators</b></p>	<p>Operators work in any of the following situations:</p> <ul style="list-style-type: none"> <li>– Inside blast cleaning rooms</li> <li>– Where silica sand is used in manual blasting operations</li> <li>– Where concentrations of toxic dust exceed the permissible exposure limits found in a separate chapter: <ul style="list-style-type: none"> <li>✂ Respiratory hazards, WAC 296-841-20020, Table-3 "Exposure Limits for Air Contaminants"</li> </ul> </li> </ul> <p><b>Exemption:</b></p> <p>✍ An abrasive respirator does not need to be worn if the operator is physically separated from the nozzle and blast by an exhaust ventilated enclosure.</p> <p><b>Definition:</b></p> <p><b>Abrasive-blasting respirator</b> A supplied air or a continuous flow respirator constructed to cover and protect the operator's head, neck and shoulders from rebounding abrasive.</p>
<p><b>Eye and Face</b> protection to both of the following:</p> <ul style="list-style-type: none"> <li>– Blasting operators</li> <li>– Personnel working near blasting operations</li> </ul>	<p>Respirators worn during blasting operations do not provide eye and face protection</p>
<p><b>Gloves and Aprons</b> made of heavy canvas or leather; <b>OR</b> <b>Equivalent protection</b></p>	<p>Operators are exposed to the impact of rebounding abrasives</p>

**Notes:**

- ✍ Use only respirators certified by NIOSH in 42 C.F.R. Part 84 for protecting employees from dusts, and other hazards produced during abrasive blasting operations, like:
  - Using a garnet sand to blast a concrete surface, resulting in crystalline silica dust
- ✍ A filtering face piece may be used only for short, intermittent, or occasional dust exposures for any of the following tasks:
  - To protect the operator during abrasive blasting operations performed outside the enclosure or outdoors where nonsilica abrasives are used on materials with low toxicity
  - Clean-up
  - Dumping dust collectors
  - Unloading shipments of sand at receiving areas when the following controls are not feasible:
    - ✂ Enclosures
    - ✂ Exhaust ventilation
- OR**
- ✂ Other means

**Reference:**

✍ For additional requirements to help you fully protect employees, go to the following separate chapters:

- The Safety and health core rules, chapter 296-800 WAC:
- ✘ Personal protective equipment (PPE), WAC 296-800-160
- Respiratory hazards, chapter 296-841 WAC
- Respirators, chapter 296-842 WAC:
- ✘ Respirator program, WAC 296-842-120
- ✘ Specifications for air quality, WAC 296-842-200

NEW SECTION

**WAC 296-818-20020 Housekeeping.**

**You must:**

- ✎ Keep aisles and walkways clear of steel shot or similar abrasives that may create a slipping hazard.
- ✎ Prohibit the accumulation of dust on the floors or ledges outside blasting enclosures.
- ✎ Clean up dust spills promptly.

**Note:** Removal of accumulated dust should be done:

- ✎ With a high efficiency particulate air filter (HEPA), vacuum cleaner when the plant is not in operation;

AND

- ✎ By a person wearing a respirator approved for the existing conditions

**Reference:**

- ✎ For additional housekeeping requirements, see the Safety and health core rules, chapter 296-800 WAC, Housekeeping, WAC 296-800-220.

NEW SECTION

**WAC 296-818-300 Operations--Summary contents.**

**Your responsibility:**

To follow these operational requirements

Combustible organic abrasives

WAC 296-818-30005

Blast cleaning enclosures

WAC 296-818-30010

Blast cleaning nozzles

WAC 296-818-30015

NEW SECTION

**WAC 296-818-30005 Combustible organic abrasive.**

**IMPORTANT:**

- ✎ This section applies to blasting operations where

flammable or explosive dust mixtures may be present.

**You must:**

✎ Prohibit the use of combustibile organic abrasives, except in automatic blast cleaning systems.

**Note:** Fine dust produced from combustibile, organic abrasive is a fire and explosion hazard.

NEW SECTION

**WAC 296-818-30010 Blast cleaning enclosures.**

**You must:**

✎ Install adequate ventilation systems in blast cleaning enclosures that are able to do all of the following:

- Control concentrations of airborne contaminants below the permissible exposure limits that apply
- Provide a continuous inward flow of air at all openings in the enclosure during blasting operations
- Minimize the escape of dust into adjacent work areas
- Maintain visibility in blast cleaning rooms and cabinets
- Rapidly clear dust from the air after blasting stops
- Discharge exhaust so contaminated air does not do either of the following:

✂ Present a health hazard to any worker; or

✂ Reenter buildings in harmful amounts

✎ Make sure ventilation systems are designed and operated so employees are not exposed to excessive air velocities

✎ Make sure make-up air systems do not interfere with the effectiveness of the exhaust system, and are designed to do both of the following:

- Replace exhausted air in ample quantities
- Temper make-up (supply) air when necessary

✎ Do both of the following before opening the blast cleaning enclosure:

- Turn the blast off
- Run the exhaust system for a sufficient period of time to clear the air of dust particles

✎ Follow the requirements in Table-2, Blast Cleaning Enclosures.

**Table-2: Blast Cleaning Enclosures**

If you have	Then make sure
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Air inlets and access openings	They are either baffled or arranged so the combination of inward airflow and baffles minimizes both of the following: – The escape of abrasive or dust particles into adjacent work areas. – Visible spurts of dust
Small access openings where dust might escape	Slit resistant baffles are installed in multiple sets at <b>all</b> small access openings, and do both of the following: – Regularly inspect them – Replace them when needed
An observation window in enclosures where hard, deep cutting abrasives are used	The window is made of safety glass protected by screening  <b>Notes:</b>  Hard, deep cutting abrasives may shatter normal glass.
	 If the safety glass shatters, the protective screening will help contain the glass and protect employees from cuts and lacerations.
Small operator access doors	They are flanged and tight when closed, and open from both inside and outside the enclosure. <b>Note:</b>  If you have a small operator access door and a large work access door, the large work access door may open or close from the outside only.

**References:**

For more information on:

 Air velocities, refer to the following:

– The latest edition of Recommended Industrial Ventilation Guidelines (ACGIH)

– NIOSH 1976 Industrial Ventilation

 Exit routes, go to the Safety and health core rules, WAC 296-800-310.

NEW SECTION

**WAC 296-818-30015 Blast cleaning nozzles.**

**You must:**

- ✎ Make sure nozzles are all of the following:
- Mounted on a support when not in use
  - Equipped with operating valves that are manually held open
  - Bonded and grounded to prevent the buildup of static charges.

- Note:** ✎ To help prevent the buildup of static charges, pressurized tanks used to supply abrasive should be:
- Connected to the manual control of the nozzle;
- AND**
- Have the relief valve or opening located so it can safely vent.

NEW SECTION

**WAC 296-818-400 Exhaust ventilation systems--Summary contents.**

**Your responsibility:**

To make sure exhaust ventilation systems meet these requirements

Construction

WAC 296-818-40005

Explosion venting and wiring

WAC 296-818-40010

Inspection and maintenance

WAC 296-818-40015

NEW SECTION

**WAC 296-818-40005 Construction.**

**You must:**

✎ Make sure exhaust systems are constructed, installed, inspected, and maintained to meet both of the following:

- The American National Standards Institute (ANSI), Z9.2-2001 for:

✂ Fundamentals Governing the Design and Operation of Local

Exhaust Systems

- The National Fire Protection Association (NFPA) 91-2004 for:

✂ Exhaust Systems for Air Conveying of Vapors, Gases and Noncombustible Particulate Solids.

**Reference:** ✂ Refer to the American National Standards Institute, ANSI Z9.4-1997 for information on the following:  
- Exhaust Systems for Abrasive-blasting Operations, Ventilation, and Safe Practices for Fixed Location Enclosures.

NEW SECTION

**WAC 296-818-40010 Explosion venting and wiring.**

**You must:**

✂ Follow the requirements in Table-3 for flammable or combustible dust mixtures

**Table-3: Explosion Venting and Wiring**

<b>If you have</b>	<b>Then</b>
Flammable or explosive dust mixtures that may be present	Make sure the construction of equipment, including the exhaust system and all electrical wiring, meets both of the following: ✂ The American National Standard Installation (ANSI) of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, NFPA 91. 2004. ✂ The electrical requirements for Class II locations in WAC 296-24-95613, located in Part L of chapter 296-24 WAC.
	Make sure blast cleaning enclosures, the ducts, and the dust collector are constructed with either loose panels or explosion venting areas that meet all of the following: ✂ Provides pressure relief in case of an explosion. ✂ Are located away from occupied areas. ✂ The Guide for Deflagations, NFPA 68. 2002.

NEW SECTION

**WAC 296-818-40015 Inspection and maintenance.**

**You must:**

✎ Make sure the exhaust ventilation system is fully operational by checking the static pressure drop at the exhaust ducts leading from the equipment at both of the following times:

- When installation is completed
- Annually after installation.

✎ Repair or clean exhaust systems when either of the following occur:

- Dust leaks are found; or
- The pressure drop gauge indicates a change exceeding 20 percent.

✎ Use an abrasive separator to separate larger particles for reuse on installations where abrasive is recirculated.

✎ Set up dust collecting equipment to do both of the following:

- Empty and remove accumulated dust without contaminating work areas
- Discharge the air used in blast cleaning equipment.

**Note:** Dispose fine dust from dry collectors by doing one of the following:

- ✎ Emptying and transporting the fine dust in enclosed containers
- ✎ Using a sluice with a wetting process to contain the dust.

NEW SECTION

**WAC 296-818-500 Definitions.**

**Abrasive:**

A solid granular substance used in abrasive blasting operations.

**Abrasive blasting:**

The forcible application of an abrasive to a surface using either:

- Pneumatic or hydraulic pressure;

OR

- Centrifugal force

**Abrasive-blasting respirator:**

A supplied air or a continuous flow respirator constructed with a shroud that covers and protects the head, neck, and shoulders.

**Automatic blast cleaning systems:**

A unit that has a blast cleaning chamber which usually has both of the following to provide a timed cleaning cycle:

- An automatic timer;

AND

- An automatic shutoff control

**Baffles:**

Partial enclosures in and around the emission sources which improve or enhance airflow at the hood.

**Blast cleaning barrel:**

A complete enclosure that rotates on an axis or an internal tread to tumble parts in order to expose various surfaces of the parts to an automatic blast spray.

**Blast cleaning room:**

An enclosed room where the operator performs blasting operations.

**Blasting cabinet:**

An enclosure where the operator stands outside using a blasting nozzle through an opening, or openings in the enclosure.

**Dust collector:**

A device in an exhaust ventilation system used to remove dust from air.

**Exhaust ventilation system:**

A system that removes contaminated air using two or more of the following:

- ✎ Enclosure or hood
- ✎ Duct work
- ✎ Dust collecting equipment
- ✎ Exhauster
- ✎ Discharge stack

**Local exhaust ventilation:**

The mechanical removal of contaminated air from the point where the contaminant is being generated or liberated.

**Make-up air systems:**

A ventilation system that controls the volume of outdoor air supplied to a building to replace air being exhausted.

**Rotary blast cleaning table:**

An enclosure where the pieces to be cleaned are placed on a rotating table and passed automatically through a series of blast sprays.

**Tempered make-up air:**

Air which has been conditioned by changing its heat content to get a specific desired temperature.

**Ventilation:**

The provision, circulation or exhausting of air into or from an area or space.

AMENDATORY SECTION (Amending WSR 05-03-093, filed 1/18/05, effective 3/1/05)

**WAC 296-304-03005 Mechanical paint removers.** (1) Power tools.

(a) The employer must ensure that employees engaged in the removal of paints, preservatives, rusts or other coatings by means of power tools are protected against eye injury by goggles or face shields that meets the requirements of WAC 296-304-09005 (1) and (2).

(b) All portable rotating tools used for the removal of paints, preservatives, rusts or other coatings shall be adequately guarded to protect both the operator and nearby workers from flying missiles.

(c) Portable electric tools shall be grounded in accordance with the requirements of WAC 296-304-08003 (1) and (2).

(d) In a confined space, the employer must provide mechanical exhaust ventilation sufficient to keep the dust concentration to a minimum, or must protect employees by respiratory protective equipment that meets the requirements of chapter 296-842 WAC.

(2) Flame removal.

(a) The employer must ensure that when hardened preservative coatings are removed by flame in enclosed spaces, the employees exposed to fumes are protected by air line respirators that meet the requirements of chapter 296-842 WAC. Employees performing this operation in the open air, and those exposed to the resulting fumes, must be protected by a fume filter respirator that meets the requirements of chapter 296-842 WAC ((~~296-62-071~~)).

(b) Flame or heat shall not be used to remove soft and greasy preservative coatings.

(3) Abrasive blasting.

(a) Equipment. Hoses and fittings used for abrasive blasting shall meet the following requirements:

(i) Hoses. Hose of a type to prevent shocks from static electricity shall be used.

(ii) Hose couplings. Hose lengths shall be joined by metal couplings secured to the outside of the hose to avoid erosion and weakening of the couplings.

(iii) Nozzles. Nozzles shall be attached to the hose by fittings that will prevent the nozzle from unintentionally becoming disengaged. Nozzle attachments shall be of metal and shall fit onto the hose externally.

(iv) Dead man control. A dead man control device shall be provided at the nozzle end of the blasting hose either to provide direct cutoff or to signal the pot tender by means of a visual and audible signal to cut off the flow, in the event the blaster loses control of the hose. The pot tender shall be available at all times to respond immediately to the signal.

(b) Replacement. Hoses and all fittings used for abrasive blasting shall be inspected frequently to insure timely replacement before an unsafe amount of wear has occurred.

(c) Personal protective equipment.

(i) The employer must ensure that abrasive blasters working in enclosed spaces are protected by abrasive blasting respirators that meet the requirements of ~~((WAC 296-24-675))~~ chapter 296-818 WAC, Abrasive blasting and chapter 296-842 WAC.

(ii) The employer must ensure that abrasive blasters working in the open are protected as required in subsection (1) of this section.

Exception:

When synthetic abrasives containing less than one percent free silica are used, the employer may substitute particulate or dust filter respirators that are approved by the National Institute of Safety and Health (NIOSH) and used according to chapter 296-842 WAC.

(iii) The employer must ensure that employees, including machine tenders and abrasive recovery workers, working in areas where unsafe concentrations of abrasive materials and dusts are present are protected by eye and respiratory protective equipment that meets the requirements of WAC 296-304-09005 (1) and (2) and chapter 296-842 WAC.

Exception:

This requirement does not apply to blasters.

(iv) The employer must ensure that a blaster is protected against injury from exposure to the blast by appropriate protective clothing, including gloves that meet the requirements of WAC 296-304-09015(1).

(v) A surge from a drop in pressure in the hose line can throw a blaster off the staging. To protect against this hazard, the employer must ensure that a blaster is protected by a personal fall arrest system, that meets the requirements of WAC 296-304-09021. The personal fall arrest system must be tied off to the ship or other structure during blasting from elevations where adequate fall protection cannot be provided by railings.

PART L--ATMOSPHERES((~~7~~) AND VENTILATION((~~7~~ ~~EMERGENCY WASHING~~)))

AMENDATORY SECTION (Amending WSR 98-02-006, filed 12/26/97, effective 3/1/98)

**WAC 296-62-11015 Abrasive blasting.** Abrasive blasting is covered in ((~~the General safety and health standards WAC 296-24-675, Safe practices of abrasive blasting operations (Part H-2)~~)) chapter 296-818 WAC, Abrasive blasting.

REPEALER

The following section of the Washington Administrative Code is repealed:

WAC 296-62-12007

Effective date.

REPEALER

The following sections of the Washington Administrative Code are repealed:

WAC 296-24-675	Safe practices of abrasive blasting operations.
WAC 296-24-67501	Purpose.
WAC 296-24-67503	Application.
WAC 296-24-67505	Selection of abrasives and equipment.
WAC 296-24-67507	Definitions.
WAC 296-24-67509	Dust hazards from abrasive blasting.
WAC 296-24-67511	Blast cleaning enclosures.
WAC 296-24-67513	Construction and maintenance of the exhaust ventilation systems.
WAC 296-24-67515	Personal protective equipment.
WAC 296-24-67517	Air supply and air compressors.
WAC 296-24-67519	Operational procedures and general safety.
WAC 296-24-67520	Ventilation.
WAC 296-24-67521	Appendix 1.